

SUMMARY DATA FOR CASE 1A

This section contains the following economic data for case 1A:

- Capital Investment and Revenue Requirement Summary
- Total Plant Cost

CAPITAL INVESTMENT & REVENUE REQUIREMENT SUMMARY				
TITLE/DEFINITION				
Case:	Natural Gas Combined Cycle-2x1"FA" w/ CO ₂			
Plant Size:	398.9 (MW,net)	HeatRate:	8,698 (Btu/kWh)	
Primary/Secondary Fuel(type):	Natural Gas	Cost:	2.70 (\$/MMBtu)	
Design/Construction:	2.5 (years)	BookLife:	20 (years)	
TPC(Plant Cost) Year:	1999 (Dec.)	TPI Year:	2000 (Jan.)	
Capacity Factor:	65 (%)	CO ₂ Removed	1,045,074 (tons/year)	
CAPITAL INVESTMENT		\$x1000	\$/kW	
Process Capital & Facilities		323,487	811.0	
Engineering(Incl.C.M.,H.O.& Fee)		19,409	48.7	
Process Contingency		9,057	22.7	
Project Contingency		51,008	127.9	
TOTAL PLANT COST(TPC)		\$402,961	1010.2	
TOTAL CASH EXPENDED		\$402,961		
AFDC		\$21,476		
TOTAL PLANT INVESTMENT(TPI)		\$424,437	1064.1	
Royalty Allowance				
Preproduction Costs		12,022	30.1	
Inventory Capital		1,916	4.8	
Initial Catalyst & Chemicals(w/equip.)				
Land Cost		164	0.4	
TOTAL CAPITAL REQUIREMENT(TCR)		\$438,540	1099.4	
OPERATING & MAINTENANCE COSTS (2000 Dollars)		\$x1000	\$/kW-yr	
Operating Labor		2,064	5.2	
Maintenance Labor		2,722	6.8	
Maintenance Material		4,083	10.2	
Administrative & Support Labor		1,196	3.0	
TOTAL OPERATION & MAINTENANCE		\$10,066	25.2	
FIXED O & M			15.00 \$/kW-yr	
VARIABLE O & M			0.18 ¢/kWh	
CONSUMABLE OPERATING COSTS,less Fuel (2000 Dollars)		\$x1000	¢/kWh	
Water		230	0.01	
Chemicals		7,455	0.33	
Other Consumables				
Waste Disposal				
TOTAL CONSUMABLE OPERATING COSTS		\$7,685	0.34	
BY-PRODUCT CREDITS (2000 Dollars)				
FUEL COST (2000 Dollars)		\$53,338	2.35	
Levelized (Over Book Life \$)				
PRODUCTION COST SUMMARY				
	\$/ton CO ₂		¢/kWh	
Fixed O & M	\$2.55	15.0/kW-yr	0.26	
Variable O & M	\$2.04		0.18	
Consumables	\$6.99		0.34	
By-product Credit				
Fuel	\$11.07		2.35	
TOTAL PRODUCTION COST	\$22.65		3.13	
LEVELIZED CARRYING CHARGES(Capital)		\$28.98	151.7/kW-yr	2.66
LEVELIZED (Over Book Life) BUSBAR COST OF POWER		\$51.63		5.79

ESTIMATE BASIS/FINANCIAL CRITERIA for REVENUE REQUIREMENT CALCULATIONS

GENERAL DATA/CHARACTERISTICS

Case Title:	Natural Gas Combined Cycle-2x1"FA" w/ CO ₂	
Unit Size:/Plant Size:	398.9 MW _{net}	398.9 MWe
Location:	East-West Region	
Fuel: Primary/Secondary	Natural Gas	
Energy From Primary/Secondary Fuels	8,698 Btu/kWh	Btu/kWh
Levelized Capacity Factor / Preproduction(equivalent months)	65 %	1 months
Capital Cost Year Dollars (Reference Year Dollars):	1999 (December)	
Delivered Cost of Primary/Secondary Fuel	2.70 \$/MBtu	\$/MBtu
Design/Construction Period:	2.5 years	
Plant Startup Date (1st. Year Dollars):	2000 (January)	
Land Area/Unit Cost	100 acre	\$1,644 /acre

FINANCIAL CRITERIA

Project Book Life:	20 years	
Book Salvage Value:	%	
Project Tax Life:	20 years	
Tax Depreciation Method:	Accel. based on ACRS Class	
Property Tax Rate:	1.0 % per year	
Insurance Tax Rate:	1.0 % per year	
Federal Income Tax Rate:	34.0 %	
State Income Tax Rate:	%	
Investment Tax Credit/% Eligible	%	%
Economic Basis:	Over Book Lif Constant Dollars	
Capital Structure	<u>% of Total</u>	<u>Cost(%)</u>
Common Equity	45	12.00
Preferred Stock	10	8.50
Debt	45	9.00
Weighted Cost of Capital:(after tax)	8.76 %	
Escalation Rates	<u>Over Book Life</u>	<u>1999 to 2000</u>
General	% per year	% per year
Primary Fuel	% per year	% per year
Secondary Fuel	% per year	% per year

Client: EPR/DOE VISION 21		Report Date: 12-Jul-2000										
Project: INNOVATIVE POWER CYCLES		11:11 AM										
Case: TOTAL PLANT COST SUMMARY												
Plant Size: Natural Gas Combined Cycle-2x1"FA" w/ CO ₂												
Estimate Type: Conceptual												
398.9 MW, net (\$x1000)												
Acct No.	Item/Description	Equipment Cost	Material Cost	Labor Direct	Labor Indirect	Sales Tax	Bare Erected Cost \$	Eng'g CM H.O. & Fee	Contingencies Process	Project	TOTAL PLANT COST \$	\$/kW
1	COAL & SORBENT HANDLING											
2	COAL & SORBENT PREP & FEED											
3	FEEDWATER & MISC. BOP SYSTEMS	3,845	3,459	5,134	359		\$12,797	768		3,119	\$16,683	42
4	GASIFIER & ACCESSORIES											
4.1	Gasifier & Auxiliaries											
4.2	High Temperature Cooling											
4.3	Recycle Gas System											
4.4-4.9	Other Gasification Equipment											
	SUBTOTAL 4											
5A	GAS CLEANUP & PIPING											
5B	CO. REMOVAL & COMPRESSION	69,128		49,358	3,455		\$121,942	7,317	9,057	20,747	\$159,063	399
6	COMBUSTION TURBINE/ACCESSORIES											
6.1	Combustion Turbine Generator	67,985		4,264	298		\$72,547	4,353		7,690	\$84,590	212
6.2-6.9	Combustion Turbine Accessories		488	806	56		\$1,350	81		429	\$1,861	5
	SUBTOTAL 6	67,985	488	5,070	355		\$73,897	4,434		8,119	\$86,451	217
7	HRSG, DUCTING & STACK											
7.1	Heat Recovery Steam Generator	23,047		9,467	663		\$33,177	1,991		3,517	\$38,684	97
7.2-7.9	HRSG Accessories, Ductwork and Stack		374	536	38		\$947	57		301	\$1,305	3
	SUBTOTAL 7	23,047	374	10,003	700		\$34,124	2,047		3,818	\$39,990	100
8	STEAM TURBINE GENERATOR											
8.1	Steam TG & Accessories	13,455		2,653	186		\$16,294	978		1,727	\$18,998	48
8.2-8.9	Turbine Plant Auxiliaries and Steam Piping	3,819	351	4,217	295		\$8,681	521		1,635	\$10,837	27
	SUBTOTAL 8	17,274	351	6,870	481		\$24,975	1,498		3,362	\$29,836	75
9	COOLING WATER SYSTEM	3,384	2,746	4,559	319		\$11,008	660		2,317	\$13,985	35
10	ASH/SPENT SORBENT HANDLING SYS											
11	ACCESSORY ELECTRIC PLANT	6,861	4,124	14,405	1,008		\$26,398	1,584		4,893	\$32,875	82
12	INSTRUMENTATION & CONTROL	2,006	252	2,454	172		\$4,884	293		704	\$5,881	15
13	IMPROVEMENTS TO SITE	1,216	661	4,606	322		\$6,805	408		2,164	\$9,378	24
14	BUILDINGS & STRUCTURES		2,430	3,950	277		\$6,656	399		1,764	\$8,820	22
	TOTAL COST	\$194,746	\$14,884	\$106,408	\$7,449		\$323,487	\$19,409	\$9,057	\$51,008	\$402,961	1010

EPRI/DOE VISION 21 INNOVATIVE POWER CYCLES TOTAL PLANT COST SUMMARY Natural Gas Combined Cycle-2x1"FA" w/ CO ₂ 398.9 MW.net Estimate Type: Conceptual												
Report Date: 12-Jul-2000 11:11 AM Cost Base (Dec) 1999 (\$x1000)												
Acct No.	Item/Description	Equipment Cost	Material Cost	Labor Direct	Labor Indirect	Sales Tax	Bare Erected Cost \$	Eng'g CM H.O.& Fee	Contingencies Process	Project	TOTAL PLANT COST \$	\$/KW
1	COAL & SORBENT HANDLING											
	1.1 Coal Receive & Unload											
	1.2 Coal Stackout & Reclaim											
	1.3 Coal Conveyors & Yd Crush											
	1.4 Other Coal Handling											
	1.5 Sorbent Receive & Unload											
	1.6 Sorbent Stackout, Storage & Reclaim											
	1.7 Sorbent Conveyors											
	1.8 Other Sorbent Handling											
	1.9 Coal & Sorbent Hnd. Foundations											
	SUBTOTAL 1											
2	COAL & SORBENT PREP & FEED											
	2.1 Coal Crushing & Drying											
	2.2 Prepared Coal Storage & Feed											
	2.3 Coal & Sorbent Feed System											
	2.4 Misc. Coal Prep & Feed											
	2.5 Sorbent Prep Equipment											
	2.6 Sorbent Storage & Feed											
	2.7 Sorbent Injection System											
	2.8 Booster Air Supply System											
	2.9 Coal & Sorbent Feed Foundation											
	SUBTOTAL 2											
3	FEEDWATER & MISC. BOP SYSTEMS											
	3.1 Feedwater System	1,187	2,308	1,805	126		\$5,425	326	1,150		\$6,901	17
	3.2 Water Makeup & Pretreating	204	22	171	12		\$408	25	130		\$563	1
	3.3 Other Feedwater Subsystems	665	248	331	23		\$1,268	76	269		\$1,613	4
	3.4 Service Water Systems	114	244	1,253	88		\$1,699	102	540		\$2,341	6
	3.5 Other Boiler Plant Systems	610	246	452	32		\$1,339	80	284		\$1,703	4
	3.6 FO Supply Sys & Nat Gas	165	312	431	30		\$937	56	199		\$1,192	3
	3.7 Waste Treatment Equipment	307		261	18		\$587	35	187		\$808	2
	3.8 Misc. Power Plant Equipment	593	80	430	30		\$1,133	68	360		\$1,562	4
	SUBTOTAL 3	\$3,845	\$3,459	\$5,134	\$359		\$12,797	\$768	\$3,119		\$16,683	42
4	GASIFIER & ACCESSORIES											
	4.1 Gasifier & Auxiliaries											
	4.2 High Temperature Cooling											
	4.3 Recycle Gas System											
	4.4 Booster Air Compression											
	4.5 Misc. Gasification Equipment											
	4.6 Other Gasification Equipment											
	4.8 Major Component Rigging											
	4.9 Gasification Foundations											
	SUBTOTAL 4											

Client: EPR/DOE VISION 21		Report Date: 12-Jul-2000										
Project: INNOVATIVE POWER CYCLES		11:11 AM										
Case: Natural Gas Combined Cycle-2x1"FA" w/ CO ₂		Cost Base (Dec) 1999 (\$x1000)										
Plant Size: 398.9 MW _{net}		Estimate Type: Conceptual										
TOTAL PLANT COST SUMMARY												
Acct No.	Item/Description	Equipment Cost	Material Cost	Labor		Sales Tax	Bare Erected Cost \$	Eng'g CM H.O.& Fee	Contingencies		TOTAL PLANT COST \$	\$ /kW
				Direct	Indirect				Process	Project		
5A	GAS CLEANUP & PIPING											
	5A.1 Gas Desulfurization(Trans.Reactor)											
	5A.2 Sulfur Recovery (Sulfator Sys.)											
	5A.3 Chloride Guard											
	5A.4 Particulate Removal											
	5A.5 Blowback Gas Systems											
	5A.6 Fuel Gas Piping											
	5A.9 HGPU Foundations											
	SUBTOTAL 5A											
5B	CO ₂ REMOVAL & COMPRESSION											
	5B.1 CO ₂ Removal System	48,515		39,305	2,751		\$90,572	5,434	9,057	15,760	\$120,823	303
	5B.2 CO ₂ Compression & Drying	20,613		10,053	704		\$31,370	1,882		4,988	\$38,240	96
	SUBTOTAL 5B	\$69,128		\$49,358	\$3,455		\$121,942	\$7,317	\$9,057	\$20,747	\$159,063	399
6	COMBUSTION TURBINE/ACCESSORIES											
	6.1 Combustion Turbine Generator	67,985		4,264	298		\$72,547	4,353		7,690	\$84,590	212
	6.2 Combustion Turbine Accessories											
	6.3 Compressed Air Piping											
	6.9 Combustion Turbine Foundations											
	SUBTOTAL 6	\$67,985		\$5,070	\$355		\$73,897	\$4,434		\$8,119	\$86,451	217
7	HRSG, DUCTING & STACK											
	7.1 Heat Recovery Steam Generator	23,047		9,467	663		\$33,177	1,991		3,517	\$38,684	97
	7.2 HRSG Accessories											
	7.3 Ductwork											
	7.4 Stack											
	7.9 HRSG,Duct & Stack Foundations											
	SUBTOTAL 7	\$23,047		\$10,003	\$700		\$34,124	\$2,047		\$3,818	\$39,990	100
8	STEAM TURBINE GENERATOR											
	8.1 Steam TG & Accessories	13,455		2,653	186		\$16,294	978		1,727	\$18,998	48
	8.2 Turbine Plant Auxiliaries	77		261	18		\$356	21		38	\$415	1
	8.3 Condenser & Auxiliaries	2,059		835	58		\$2,952	177		313	\$3,442	9
	8.4 Steam Piping	1,683		2,168	152		\$4,003	240		849	\$5,091	13
	8.9 TG Foundations											
	SUBTOTAL 8	\$17,274		\$6,870	\$481		\$24,975	\$1,498		\$3,362	\$29,836	75
9	COOLING WATER SYSTEM											
	9.1 Cooling Towers	1,571		511	36		\$2,117	127		224	\$2,469	6
	9.2 Circulating Water Pumps	397		56	4		\$456	27		48	\$532	1
	9.3 Circ.Water System Auxiliaries	124		26	2		\$152	9		16	\$177	0
	9.4 Circ.Water Piping											
	9.5 Make-up Water System	1,108		756	53		\$2,642	159		560	\$3,361	8
	9.6 Component Cooling Water Sys	184		1,216	85		\$2,409	145		511	\$3,065	8
	9.9 Circ.Water System Foundations											
	SUBTOTAL 9	\$3,384		\$4,559	\$319		\$11,008	\$660		\$2,317	\$13,985	35

Client: EPR/DOE VISION 21 Project: INNOVATIVE POWER CYCLES Case: Natural Gas Combined Cycle-2x1"FA" w/ CO: Plant Size: 398.9 MW.net Estimate Type: Conceptual										Report Date: 12-Jul-2000 11:11 AM	
TOTAL PLANT COST SUMMARY										Cost Base (Dec) 1999 (\$x1000)	
Acct No.	Item/Description	Equipment Cost	Material Cost	Labor Direct	Labor Indirect	Sales Tax	Bare Erected Cost \$	Eng'g CM H.O. & Fee	Contingencies Process	Project	TOTAL PLANT COST \$/KW
10	ASH/SPENT SORBENT HANDLING SYS										
10.1	Gasifier Ash Removal	748		978	68		\$1,794	108		190	\$2,092
10.2	Gasifier Ash Depressurization	981		117	8		\$1,106	66		117	\$1,290
10.3	Cleanup Ash Depressurization	1,209		291	20		\$1,521	91		242	\$1,854
10.4	High Temperature Ash Piping		1,621	7,354	515		\$9,490	569		2,012	\$12,071
10.5	Other Ash Recovery Equipment		1,938	2,799	196		\$4,933	296		1,046	\$6,274
10.6	Ash Storage Silos		462	2,226	156		\$2,844	171		452	\$3,467
10.7	Ash Transport & Feed Equipment	73		95	7		\$174	10		28	\$213
10.8	Misc. Ash Handling Equipment	3,850		142	10		\$4,001	240		636	\$4,878
10.9	Ash/Spent Sorbent Foundation			404	28		\$535	32		170	\$737
	SUBTOTAL 10:										
11	ACCESSORY ELECTRIC PLANT										
11.1	Generator Equipment										
11.2	Station Service Equipment										
11.3	Switchgear & Motor Control										
11.4	Conduit & Cable Tray										
11.5	Wire & Cable										
11.6	Protective Equipment										
11.7	Standby Equipment										
11.8	Main Power Transformers										
11.9	Electrical Foundations										
	SUBTOTAL 11:	\$6,861	\$4,124	\$14,405	\$1,008		\$26,398	\$1,584		\$4,893	\$32,875
12	INSTRUMENTATION & CONTROL										
12.1	IGCC Control Equipment										
12.2	Combustion Turbine Control										
12.3	Steam Turbine Control										
12.4	Other Major Component Control										
12.5	Signal Processing Equipment										
12.6	Control Boards, Panels & Racks										
12.7	Computer & Accessories										
12.8	Instrument Wiring & Tubing										
12.9	Other I & C Equipment										
	SUBTOTAL 12:	\$2,006	\$252	\$2,454	\$172		\$4,884	\$293		\$704	\$5,881
13	IMPROVEMENTS TO SITE										
13.1	Site Preparation										
13.2	Site Improvements										
13.3	Site Facilities										
	SUBTOTAL 13:	\$1,216	\$661	\$4,606	\$322		\$6,805	\$408		\$2,164	\$9,378
14	BUILDINGS & STRUCTURES										
14.1	Combustion Turbine Area		150	136	9		\$295	18		78	\$391
14.2	Steam Turbine Building		964	2,190	153		\$3,308	198		877	\$4,383
14.3	Administration Building		277	321	22		\$620	37		164	\$822
14.4	Circulation Water Pump House		93	78	5		\$176	11		47	\$233
14.5	Water Treatment Buildings		234	364	26		\$624	37		165	\$827
14.6	Machine Shop		240	262	18		\$321	31		138	\$690
14.7	Warehouse		388	400	28		\$816	49		216	\$1,081
14.8	Other Buildings & Structures		46	58	4		\$108	6		29	\$143
14.9	Waste Treating Building & Sir.		36	141	10		\$187	11		50	\$248
	SUBTOTAL 14:	\$2,430	\$3,950	\$277			\$6,656	\$399		\$1,764	\$8,820
	TOTAL COST	\$194,746	\$14,884	\$106,408	\$7,449		\$323,487	\$19,409	\$9,057	\$51,008	\$402,961
											1010